

REMARKS

Claims 1-8, 11, 14-15, 17-28 and 32 are pending.

It is respectfully submitted that the present response presents no new issues or new matter and places this case in condition for allowance. Reconsideration of the application in view of the following remarks is requested.

I. The Rejection of Claims 1-8, 11, 14-15 and 17-28 under 35 U.S.C. 103

Claims 1-8, 11, 14-15 and 17-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liddell et al. in view of Neubeck. The Examiner acknowledges that Neubeck's enzyme concentrate composition differs from the un-concentrated fermentation broth composition involved in the spray drying process of the present invention, however, the Examiner states that Neubeck is cited to show the benefit of having enzyme present in conjunction with the whole cells ("biomass") of Liddell et al.

This rejection is respectfully traversed. The present invention is directed to spraying drying a fermentation broth starting material to obtain a solid particle comprising an enzyme and a biomass. Applicants have surprisingly discovered that fermentation broth composition has a sufficient enzymatic activity after it has been subject to a spray drying process and is useful as a spray drying composition. See the specification, e.g., at page 15, lines 6-18. Neither Liddell et al. nor Neubeck teach or suggest that a fermentation broth composition will, after spray drying, have a sufficiently high enzyme activity, and, thus serve a suitable composition for spray drying.

Liddell et al. discloses spraying drying whole microorganisms, and is clearly concerned with the benefit obtained from spraying viable cells. The Examiner generally refers to the whole cells in Liddell et al. as "biomass", however, it is the presence of viable cells that is the critical aspect of Liddell et al.'s teaching. Indeed, as disclosed in Liddell et al., it is key that the spray dried microorganisms survive the spray drying process and retain biocatalytic activity. See Liddell et al. at col. 1, lines 39-55 and col. 2, lines 3-11.

In the present invention, although viable cells may be present in some embodiments, there presence is not critical to obtain the desired spray dried composition, and the absence of viable cells is even preferred. In contrast to Liddell et al., Applicants have surprisingly discovered the fermentation broth itself has sufficient enzymatic activity after it has been spray dried, regardless of the viability of the cells. See the specification at page 15, lines 6-12. Indeed, as disclosed in Example 1 of the present invention, the fermented microorganism may even be killed, yet the fermentation broth will still suffice as a suitable composition for spray drying according to the

present invention. See Example 1, page 38-39 (stating that the fermented micro-organisms were killed, but the resulting spray dried powder still had a sufficient activity.) Clearly, given that the presence of viable microorganisms after spray drying is critical to Liddell et al., there can be no teaching or suggestion in Liddell et al. that a fermentation broth composition, which may or may not contain viable microorganisms, will also be still be suitable for use in a spray drying process.

The addition of Neubeck to Liddell et al. also does not provide the teaching of spray drying a fermentation broth. Indeed, Neubeck is directed to spraying drying a concentrated enzyme solution, and the only teaching derived from Neubeck is that in order to obtain a sufficient spray dried enzyme product you must concentrate the enzyme. Thus, Neubeck clearly has no recognition whatsoever that you do not need to concentrate the enzyme before spraying drying, and could therefore, spray dry a fermentation broth starting material.

Moreover, although Applicants do not see that Liddell et al and Neubeck in any way teach or suggest spray drying the very different composition of a fermentation broth starting material, their combination does not lead to the conclusions asserted by the Examiner. In particular, on page 3 of the Advisory Action of July 28, 2003, the Examiner concludes that it would be "obvious to one of ordinary skill in the art to leave the cells in the fermentation broth starting material prior to spray drying in order to obtain the benefits of the cells." This conclusion, however, is clearly not proper as there is no teaching in any of the cited reference to spray dry a fermentation broth which, as shown above (including in Example 1), is significantly different from the viable cells of Liddell et al. or the concentrated enzyme composition of Neubeck.

On page 3 of the Advisory Action of July 28, 2003, the Examiner concludes, in the alternative, that it "would have been obvious to one of ordinary skill in the art leave enzyme with biomass before spray drying the composition in order to increase the enzyme activity of the Liddell et al. composition." Again, this conclusion is clearly not supported by the cited art as Neubeck clearly teaches that it is necessary to concentrate the enzyme before spray drying, and thus, Liddell et al. in view of Neubeck, at best, motivates an artisan to add concentrated enzyme solutions to viable cells. This is not, however, what is claimed in the present invention, and there is no recognition in any of the cited references, that a fermentation broth composition, that (1) is also suitable without viable cells and (2) is an un-concentrated enzyme composition, would have sufficient activity after spray drying to serve as a suitable composition for spray drying.

Therefore, the combination of Liddell et al.'s spraying drying of viable cells in view of Neubeck's spraying drying of a concentrated enzyme composition clearly does not suggest a process of spraying drying a fermentation broth composition.


For the foregoing reasons, Applicants submit that the claims overcome this rejection under 35 U.S.C. 103(a). Applicants respectfully request reconsideration and withdrawal of the rejection.

II. Conclusion

In view of the above, it is respectfully submitted that all claims are in condition for allowance. Early action to that end is respectfully requested. The Examiner is hereby invited to contact the undersigned by telephone if there are any questions concerning this amendment or application.

Respectfully submitted,

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